



US005662731A

[11] Patent Number: 5,662,731
 [45] Date of Patent: Sep. 2, 1997

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[57]

ABSTRACT

Compositions, methods, and systems for manufacturing articles, particularly containers and packaging materials, having a fiber-reinforced, starch-bound cellular matrix. Suitable mixtures used to form the articles are prepared by first preparing a viscous preblended mixture comprising water, a gelatinized starch-based binder, and fibers having an average length greater than about 2 mm. The highly viscous preblended mixture effectively transfers the shearing forces of the mixer to the fibers. The final moldable mixture is then prepared by mixing into the preblended mixture the remaining starch-based binder, water, and other desired admixtures, e.g., mold-releasing agents, inorganic filler rheology-modifying agents, plasticizers, coating materials, and dispersants, in the correct proportions to form an article which has the desired performance criteria. The moldable mixtures are heated between molds at an elevated temperature and pressure to produce form-stable articles having a desired shape and a selectively controlled foamed structural matrix. The articles may be manufactured to have properties substantially similar to articles presently made from conventional materials like paper, paperboard, polystyrene, plastic, or other organic-based materials and have especial utility in the mass-production of containers, particularly food and beverage containers.

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